HOW-TO-PREPARE GUIDE

FOR THE

TRANSPORTATION TECHNOLOGIST (20481)

WRITTEN EXAMINATION

Bridge Design (005) Option

Materials and Tests (006) Option

Design (007) Option

Construction (438) Option

Analysis and Planning (439) Option

Underwater Bridge Inspection (498) Option

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Transportation Technologist (20481)

Written Examination

How to Prepare Manual

As a candidate for the Transportation Technologist (TT) position within the Alabama State Merit System, you have indicated your interest in participating in the TT selection procedure. The TT selection procedure will consist of two parts: 1) An assembled written examination, and 2) an evaluation of your work experience as shown on your application. Your final score will be calculated using the results of the written examination and the evaluation of your work experience.

This guide is provided to acquaint you with the TT job and to help you prepare for the written exam. Read this information very carefully. This guide contains information which you should find very helpful as you prepare for the written exam.

The Transportation Technologist Testing Procedure

The TT job consists of six options. These are: Bridge Design (005), Materials and Tests (006), Design (007), Construction (438), Analysis and Planning (439), and Underwater Bridge Inspection (498). A description of the job duties for each of these options will follow later in this booklet.

A thorough job analysis of each TT option revealed that some of the same knowledges, skills, and abilities (KSAs) were necessary for successful job performance in all six options. This same job analysis revealed that these KSAs were also required on the first day of work as a TT in all six options. In other words, these KSAs should be possessed by a TT job candidate, in every option, before they are hired and before any on-the-job training occurs. These KSAs will be measured on the written test and are listed in a later section of this booklet.

The same analysis also revealed other KSAs which are important and are needed at entry but are not required in every option. Some of these option-specific KSAs will be measured in an evaluation of your work experience shown on your job application. This evaluation will take place at the State Personnel Department (SPD); there is no assembled examination for these option-specific KSAs. Each of the six options will have different evaluation criteria so the value of your work experience will vary depending upon the option(s) for which you have applied. For example, experience working in Materials and Tests area will be more valuable than experience working in Bridge Design area when applying for the TT Materials and Tests option. Likewise, Bridge Design experience will be more valuable than Materials and Tests experience when applying for the TT Bridge Design option. A complete list, by option, of these option-specific KSAs is included in Appendix "A".

Once your application is accepted, you will first be scheduled for the written test. Only those who complete the written test will proceed to the second part of the testing procedure, the work

experience evaluation. If you do not participate in the written test, your application will be processed no further and your name will NOT be placed on the employment register.

Once the written test procedure is complete, the work experience evaluation will then take place and those applicants will be placed on the employment register.

Participating in the Transportation Technologist Test Procedure

Once the SPD has determined that you meet the minimum qualifications, you will be notified by the SPD of your written test date and time. Even if you apply for more than one option, you will only take one written test. For example, let's say you apply and qualify for the Bridge Design and Construction options. You will only take one written test even though you have qualified for more than one option. Once you have completed the written test, your work experience will be evaluated against the criterion established for the Bridge Design option and for the Construction option. The same written test score will be used as a component of your score for both options. In other words, your same written test score will be a component of both your Bridge Design option final score and Construction option final score. Your final Bridge Design option score will be composed of your written test score and the results of your work experience evaluation. Likewise, your Construction Option score will be composed of the written test results and the Construction Option work experience evaluation.

You may apply for as many options as you feel you qualify. In fact, you are encouraged to do so. A separate application must be completed for each option for which you wish to apply. You will only be allowed to take the written test once every nine months. For this reason, you should apply for every option that interests you at the **same time**. If you apply for an option and take the written test, you must wait at least nine months before you will be allowed to retake the written test for additional options.

Test Scheduling

If you are interested in applying for a TT position, you must **first file an application with the SPD.** Remember that a separate application is required for each option. It is the applicant's responsibility to ensure the application arrives at the SPD. Tests are given periodically throughout the year. Do not wait for an official announcement from the SPD or the Alabama Department of Transportation (ALDOT) about test dates or application cutoff dates. Instead, if you are interested in applying, you should do so as soon as you feel you are qualified.

Once your application is received, it will be reviewed to ensure you have the minimum qualifications required to qualify for each option for which you have applied. If you meet the minimum qualifications for a particular option, you will be sent a scheduling card that will contain your written test date, time, and location as well as some other necessary information you need to know about the test. If you have a conflict with your scheduled date, time, or location, you should call the SPD and inquire into the feasibility of rescheduling your exam. Please be aware that rescheduling your exam is not always possible due to limited test dates and times. You should make every effort possible to participate in the

written test on your originally scheduled date and time.

The Transportation Technologist Job

TT positions are available statewide. Employees in this class perform technical work in an area of civil engineering and the job may include some supervisory duties. Depending on the option assigned, employees in this class may serve as construction project managers responsible for supervising the construction inspection of simple to moderately difficult roadway and bridge projects, detailing moderately complex bridge plans, producing complete sets of finished roadway plans, completing an assigned phase of transportation planning activities, overseeing qualitative material testing and investigations relating to construction material testing, or assisting a lead diver in the inspection, maintenance, and repair of underwater bridge components. Detailed below are more specific duties typically performed in each option.

BRIDGE DESIGN OPTION (005)

Employees in the Bridge Design Option begin performing paraprofessional technical work in the bridge design area of civil engineering. Employees in this class are assigned to the detailing of moderately complex bridge projects. Job activities include performing computation of bridge plan quantities and drafting bridges and bridge structures. Employees may supervise lower level assistants in the completion of duties. At entry into the job, a superior reviews work while in progress and at its conclusion.

MATERIALS and TESTS OPTION (006)

Employees in the Materials and Tests Option begin performing paraprofessional technical work in the materials and testing area of civil engineering. Employees in this class are assigned to conduct or oversee qualitative material testing and investigations relating to proposed and active construction projects. Job activities include running various material tests such as gradations, air voids, or soil analysis at plants or in the state or division lab. Employees may supervise lower level assistants in the completion of duties. At entry into the job, a superior reviews work while in progress and at its conclusion.

DESIGN OPTION (007)

Employees in the Design Option perform paraprofessional technical work in the roadway design area of civil engineering. Employees in this class produce detailed sheets of roadway plans or complete sets of finished roadway plans. Job activities might include performing computation of quantities of earthwork, hydraulics, concrete, steel, and right-of-way acreage. Employees may supervise lower level assistants in the completion of duties. At entry into the job, a superior reviews work while in progress and at its conclusion.

CONSTRUCTION OPTION (438)

Employees in the Construction Option begin performing paraprofessional technical work in the area of monitoring the construction of roadways and bridges. Employees are assigned as a construction project

manager responsible for supervising the construction inspection of simple to moderately difficult roadway and bridge projects. Job activities may also include serving as assistant construction project manager on major projects. Employees may supervise lower level assistants in the completion of project inspection duties. At entry into the job, a superior reviews work while in progress and at its conclusion.

ANALYSIS and PLANNING OPTION (439)

Employees in the Analysis and Planning Option begin performing paraprofessional technical work in various areas of civil engineering such as traffic, multimodal, bridge inspection, or surveying. Job duties might include supervising an assigned phase of transportation planning activities, serving as assistant chief bridge inspector in a division, serving as a survey field supervisor, serving as a district permit officer, district operations engineer, or conducting various other analyses or planning activities. Employees may supervise lower level assistants in the completion of duties. At entry into the job, a supervisor reviews work while in progress and at its conclusion.

UNDERWATER BRIDGE INSPECTION OPTION (498)

Employees in the Underwater Bridge Inspection Option assist a lead diver in the inspection, maintenance, and repair of underwater bridge foundations and other underwater structures owned or maintained by the department. Although the work involves underwater inspection duties, the majority of work will be as a topside technician assisting a diving inspector. Duties may include assisting the primary diver in investigating, repairing and maintaining underwater elements, setting up and maintaining different types of diving gear, repairing dive gear and related equipment, maintaining a daily dive log, and assisting in making bottom profiles for scour investigation. Work is performed under the technical supervision of a lead diver/inspector, and is reviewed and evaluated in terms of conformance with established policies and procedures.

Job Analysis Results

As stated earlier, the job analysis of each TT option revealed that some of the same KSAs were necessary in all six options for successful job performance and were required upon entry into the job. Listed below are the KSAs that meet these requirements. These KSAs will be measured by the written examination. These KSAs have been grouped into four categories which represent the four sections of the written exam.

When reviewing these KSAs and preparing for the written test, the reader should note that the examples shown in each statement of how the KSA is used is not always intended to be completely inclusive. In other words, there may be questions on the exam which cover areas not directly mentioned as an example in the KSA.

1. Grammar and Document Composition

Knowledge of grammar to include sentence structure and punctuation as needed to write correspondence and complete forms.

Ability to edit written documents as needed to make revisions to memoranda, letters, and reports.

2. Basic Computer Software

Knowledge of basic computer software such as Windows and Excel as needed to compose letters, calculate quantities, and keep a card file.

3. Basic Math

Knowledge of basic mathematics principles and application as needed to use the appropriate formula to solve problems.

Ability to perform basic math functions such as addition, subtraction, multiplication, and division as needed to calculate quantities, compute traffic data, calculate payroll information, and gather field measurements.

4. Reading Comprehension

Ability to read and comprehend technical engineering documents and manuals as needed to obtain information necessary to perform the job.

Ability to read letters, memoranda, etc. from individuals such as contractors, public officials, coworkers, supervisors, and the general public as needed to answer questions, obtain information, and respond to requests for information.

Written Examination Description

In an attempt to provide an opportunity for each candidate to demonstrate their possession of the knowledges and abilities listed above, a multiple-choice, written examination was developed. This exam is referred to as the Written Test. The written test will consist of approximately 100 questions and you will be allowed three hours in which to complete the exam. Your answers will be marked on a Scantron sheet using a #2 pencil.

As described above, the written test is divided into four sections: 1) Grammar and Document Composition, 2) Basic Computer Software, 3) Basic Math, and 4) Reading Comprehension. Each section is comprised of questions which measure the knowledges or abilities listed above. Listed below is a description of each section and some important information you will need to know in order to do well on the exam.

SECTION ONE: Grammar and Document Composition

The job analysis showed the ability to communicate in writing is important in the TT job in all six options. The questions in this section are designed to simulate the problems encountered by someone who is drafting or editing a letter, memo, or report.

Here is an example of one type of question you will encounter on this section of the written test:

Example Question 1: INSTRUCTIONS: The sentences in the following paragraph may or may not be in the proper order. Choose the answer that lists the sentences in the order that makes the most sense.

(1) I have a son named John.
(2) He will start tomorrow.
(3) That means he is old enough to start school.
(4) He is five years old.

A. 1-2-3-4
B. 2-4-3-1
C. 1-4-3-2
D. 4-3-2-1

The correct choice is "C". The sentences should be arranged "1-4-3-2".

Here are examples of other types of questions you may encounter on this exam.

Example Question 2: Determine which of the statements is most effective in terms of clarity, sentence structure, and grammar.

A. The discussions of the committee were repeatedly interrupted.
B. Repeated interruptions disrupted the deliberations of the committee.
C. There were repeated interruptions to the deliberations of the committee.
D. There were repeated interruptions of the deliberations of the committee.

The correct answer is "A." While the other statements might be acceptable, they are not as clear and effective as statement A. Therefore, "A" should be marked as the correct answer.

Example Question 3: INSTRUCTIONS: This section of the examination consists of a series of sentences. The sentences contain numbered sections separated by / marks.

You are to read the sentences and indicate the section of the sentence that contains an error in grammar, punctuation, or word usage using the key below.

KEY

A. There is an error in part "1" of the sentence.
B. There is an error in part "2" of the sentence.
C. There is an error in part "3" of the sentence.
D. There are no errors in the sentence.

1 2 3

The unit for blood transfusions are / on the second / floor of the hospital.

The correct answer is "A," there is an error in part "1" of the sentence. In this sentence, the word "are" should not have been used. The word "is" should have been used instead.

Finally, you will be presented with a rough draft letter and you will be asked to determine whether certain sentences should be rewritten, left as written, or removed completely. These types of questions will be presented in a multiple-choice format where each alternative way of writing the sentence is given to you. You then have the option of leaving the sentence as it is, choosing one of the alternative ways of writing the sentence, or in some cases, removing the sentence altogether.

SECTION TWO: Basic Computer Software

In this section of the exam, you will be presented with questions regarding basic commands used in Microsoft Word and Excel.

Example Question 4: The  icon is used to:

A. Run spell check.
B. Display the document.
C. Undo the last action taken.
D. Redo the action of the undo command.

The correct answer is "D," in Word or Excel, this icon is used to redo the action of the undo command.

You will also be asked to look at variations of an Excel formula and determine which formula is in the correct format. To do well on these questions, you will need to know how to set up Excel formulas that add, subtract, multiply and divide numbers. You should also be familiar with and know how to set up Excel if/then statements.

SECTION THREE: Basic Math

This section of the written test will measure your knowledge of basic math and your ability to perform some basic functions such as addition, subtraction, multiplication, and division. This knowledge/ability is needed to calculate things such as slope ratios, percentages of numbers, area, material qualities, and volumes. You may also be tasked with performing different types of conversions such as temperature conversions, converting cubic feet to cubic yards, and fractions to decimals. You will also be tasked with calculating dimensions and other features of right triangles. The multiple choice questions in this section of the examination will measure your ability to perform many of these functions. You should always round your answers to the number of decimal places shown in the given answers.

Obviously, to perform the types of calculations and conversions stated above, you will need various formulas. **The formulas shown in the chart below will be provided to you during the exam.** You may or may not need all of them. During the exam, you will have to determine which is the correct formula to use for a given problem.

Note: When you see the lowercase letter "x" in a formula, that means you should multiply the numbers before and after the lowercase "x".

MATH FORMULAS

Area of a Circle

$A = Pi \times r^2$

Or

$A = Pi \times (d/2)^2$

Pi = 3.14
r = radius
d = diameter

To convert square yards to square feet.

Sq. yd. x 9 = Sq. ft.

To convert square feet to square yards.

Sq. ft. ÷ 9 = Sq. yds.

To convert cubic feet to cubic yards.

$Yd^3 = ft^3 \div 27$ ft.

To convert a fraction to a decimal.

Divide the numerator by the denominator. For example:

¼ = 1 ÷ 4 = .25

Volume of a Cylinder

= Area x Height

Fahrenheit to Centigrade

C = (F -32) ÷ 1.8 F = Fahrenheit temperature
C = Centigrade

Centigrade to Fahrenheit

F = (C x 1.8) + 32

Area of a Rectangle

A = L x W L = Length
W = Width

MATH FORMULAS (Continued)

Finding Percentage of Numbers

Examples:
30 ÷ 60 = .5
Therefore, 30 is 50 % of 60

55 x .2 = 11
Therefore 11 is 20 % of 55

Slope Ratio (For this exam)

= Rise over Run
Therefore, a slope that drops 6" over 12" would be expressed as 6:12 or 1:2

The closer the rise number is to the run number in the ratio, the steeper the slope. For example a slope of 3:4 is steeper than a slope of 1:4

1 ton = 2,000 pounds

1 mile = 5,280 feet

To find the length of any side of a right triangle

Side A^2 + Side B^2 = Side C^2 (Round result to two decimal places for this exam.)

The following are some examples of the types of questions you will encounter in this section of the written exam:

Example Question 5: Solve this equation: Q = C x I x A where C = 4, I = 25, and A = 13.7.

A. 42.7
B. 1,370
C. 113.7
D. Not Given

The correct answer is "B," 1,370. (4x25x13.7=1,370) Therefore Q = 1,370.

Example Question 6: A plan set has the following dimensions of length for a bridge. What is the total length of the bridge?

28'-½'', 28'-½'', 28'-½", 28'-½"

A. 112' 2"
B. 114' 10½"
C. 114'
D. Not given

The correct answer is "A," 112' 2".

Example Question 7: What is the area of a circle where the radius is 8 feet?

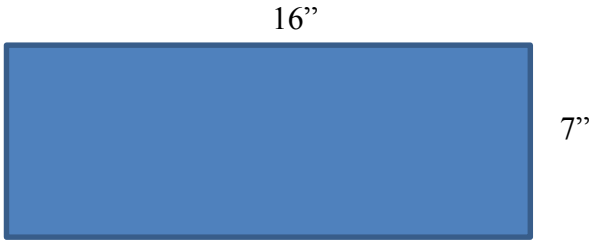
A. 42.35
B. 72.75
C. 200.96
D. 342.85

By referring to the provided formulas, we know that the formula for calculating the area of a circle is:

$A = Pi \times r^2$
$A = 3.14 \times 8^2$
$A = 3.14 \times 64$
$A = 200.96$

The correct answer is "C," 200.96.

:



Example Question 8: What is the area of the above rectangle in square inches?

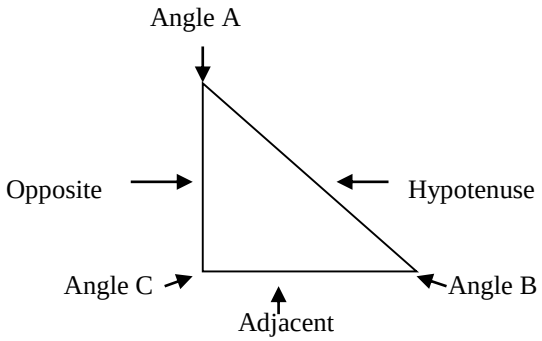
A. 60”
B. 72 “
C. 50”
D. Not Given

By referring to the provided formulas, we know that the formula for calculating the area of a rectangle is:

A = L x W
A – 16” x 7”
A = 112”

Because 112”is not one of the provided answers, the correct answer is “D,” “Not Given.”

Use the formulas and the diagram of a right triangle provided below to answer the next question.



$$\text{Sine} = \frac{\text{Opposite}}{\text{Hypotenuse}} \qquad \text{Cosine} = \frac{\text{Adjacent}}{\text{Hypotenuse}} \qquad \text{Tangent} = \frac{\text{Opposite}}{\text{Adjacent}}$$

Example Question 9: What is the sine of angle "B" if the opposite side is 6 inches and the hypotenuse side is 11 inches?

A. .0635
B. .3136
C. .5455
D. .6664

Using the formula to calculate sine, we know that:

$$\text{Sine} = \frac{\text{Opposite}}{\text{Hypotenuse}}$$

$$\text{Sine} = \frac{6}{11}$$

$$\text{Sine} = .5455$$

The correct answer is "C," .5455

When completing the math section of the exam, you will encounter questions similar to the ones shown in the examples as well as other types of questions. You will need to use the formulas provided as well as basic addition, subtraction, multiplication, and division skills to correctly answer these questions. You also need to be able to read a problem and determine which of the provided formulas should be used. To prepare for this section of the exam, you should study these example questions as well as familiarizing yourself with the provided formulas and their applications.

If you feel you need work in any of these areas, you should ask someone to help you or review a textbook on basic math.

SECTION FOUR: Reading Comprehension

The job analysis revealed the ability to read and comprehend technical engineering documents and manuals and the ability to read letters, memoranda, etc. are important abilities that are needed in all TT jobs. In this section of the exam, you will read several passages of text and then answer questions based upon those passages. The passages will be various sections of manuals or technical engineering documents.

The following is an example of the types of questions you will encounter on the reading and comprehension section of the written exam:

INSTRUCTIONS: Read the passage below and then answer the questions that follow. Base your answer only on this passage and not on any prior knowledge.

PAVEMENT MARKINGS FOR GRADE CROSSING

Pavement markings in advance of a grade (railroad) crossing shall consist of an 'X', the letters 'RR', a no passing marking (for two-lane roads), and certain transverse lines (stripes that run horizontally across one lane of road). Identical markings shall be placed in each appropriate lane on all paved approaches to grade crossings where grade crossing signals or automatic gates are located, and at all other grade crossings where the prevailing speed of highway traffic is 40 mph or greater.

The markings shall also be placed at crossings where the engineering studies indicate there is a significant potential conflict between markings, but may be omitted if the engineering study indicates that other devices installed provide suitable control.

The railroad crossing pavement markings of 'X' and 'RR' shall be elongated to allow for the low angle at which they are viewed. All pavement marking shall be reflectorized white except for no-passing markings which will be reflectorized yellow.

Example Question 10: Pavement markings will be in reflectorized white, except for:

A. the "X".
B. the "RR".
C. transverse lines.
D. the no passing markings.

The correct answer is "D," "the no passing markings."

In order to prepare for the reading and comprehension section of the written exam, you could review various manuals, technical documents, letters, or memoranda. You could then ask someone to make up sample questions based upon the reading materials or ask others who are familiar with the job to ask you questions from those reading passages.

Preparing for the Written Test Procedure

Candidates often ask how they should study for an exam like this one. It is important to focus on what will be measured and how it will be measured. You should carefully review the knowledges and abilities contained in this booklet as well as the information provided about the questions in each section.

The three most important things you can do to help prepare for the TT examination are to (1) review the knowledges and abilities, (2) **thoroughly** review the information provided about each section's questions and be familiar with the things you will need to know in order to answer the questions, and (3) read this manual to become familiar with the testing process so that you will be more relaxed and not confused during the administration.

What to Expect On the Written Exam Day

1. Allow plenty of time to get to the written test site. Plan to get there at least 30 minutes before the written test is scheduled to begin.
2. To protect your own interests, you must bring a PICTURE IDENTIFICATION to the written examination site. This can be a valid driver's license, a military identification card, a student identification card, or some other form of PICTURE IDENTIFICATION. You only need one form of PICTURE IDENTIFICATION. No photocopied IDs will be accepted.
3. During the registration process, you will be asked to verify the last four digits of your Social Security number.
4. Do not bring your own calculator. You will be provided with a small solar powered or battery operated calculator that performs basic functions such as addition, subtraction, multiplication, division, square roots, and percentages.
5. You will be provided with the pencils you will need to mark your Scantron sheet.
6. Do not bring cell phones, two-way radios, or any other noise producing devices with you to the written test room. You will not be allowed to have these in the written test room.
7. Come dressed comfortably. The total time provided for completion of the written exam will be 3 hours.
8. Do NOT bring this booklet or any study materials to the written test site. You will not be permitted to bring them in. You will not be allowed to use any study or reference materials during the written exam other than the materials provided to you in the test booklet.
9. The monitor will provide you with instructions concerning restroom availability during the written test administration. It is important to remember that the time that you take to use the restroom is time away from working on the written test. We recommend that you use the

restroom before the test begins.

10. Test monitors can answer questions concerning administration issues only. They will not be able to interpret the written test questions for you.

11. Candidates making any disturbance or caught cheating will be disqualified from the exam.

Tips for Taking the Written Examination

- Use your time wisely. You will have **three** hours to take the written exam. You may want to bring a watch with you to keep up with your time. Please turn off any alarm before you get to the test facility. While taking the examination, if you do not know the answer to a question, do not spend too much time thinking about it. Instead, move on to another question and return to the questions you have skipped if you have time.
- **Carefully** review each written test question before you attempt to answer it. The written test questions are not intended to be **"tricky"** but you will need to read the question **very carefully** to make sure you understand what it is asking. Also, if the written test question asks you to determine which one of the following statements is correct, many of the incorrect alternatives may appear to be plausible so read carefully. If any part of a statement is incorrect then the statement is incorrect.
- Darken the circles completely on the Scantron sheet so there is no doubt which answer you are giving. If you change your mind, make sure you erase completely.
- You will be allowed to mark or take notes in your written test booklet; however the only information that will be scored is the answers you mark on your Scantron sheet. You will be provided with two pieces of scratch paper. These will be collected at the end of the written test.
- **DON'T PANIC**. In a test like this one, some parts may seem more difficult to you than other parts. Don't give up. If it is hard for you to figure out an answer, it is probably hard for other people, too.

Administration Contact

The contact for the TT examination is Karen Walkley at (334) 242-3692.

Reasonable Accommodation

If you would like to request special testing accommodations or have any questions concerning the written test site or written testing conditions, please contact us at the phone number above.

Administrative Questions

You may contact us if you have any administrative questions or concerns about information presented in this booklet. It is not necessary for you to contact us in order to receive your final grade; you should receive notification of your standing on the register by postcard after the scoring of your written test and the evaluation of your work experience is completed. Final scores will be calculated and published for all options at the same time. You can expect to receive your score(s) 4 to 6 weeks after the completion of the written test.

Please remember that you will not need OR be allowed to bring anything other than the items previously mentioned to the written test site.

If you fail to appear at the examination on your scheduled day and time, you will need to submit a new application to the SPD in order to be scheduled for future administrations.

Reminders

Option-specific KSAs for all six TT options will be measured in a work experience evaluation. This evaluation will be based solely on the information provided on the application you filed with the SPD. Option-specific KSAs are described in Appendix A.

Work experience evaluations will be conducted only for those who complete the written test. If you do not complete the written test or withdraw during the written test, your work experience will not be evaluated, your application will not be processed, and your name will not be placed on the register.

You will only be allowed to take the written test once every nine months. For this reason, you should apply for every option that interests you at the **same time**. Please remember that a separate application is required for each option. If you apply for an option and take the written test, you must wait at least nine months before you will be allowed to retake the written test for additional options.

It is the applicant's responsibility to ensure the application(s) arrive at the SPD. Tests are given periodically throughout the year. Do not wait for an official announcement from the SPD or ALDOT about test dates or application cutoff dates. Instead, if you are interested in applying, you should do so as soon as you meet the minimum qualifications.

This concludes the How to Prepare Manual for the TT Written Examination.

APPENDIX A

TT Option-Specific KSAs

Grouped by Options

TRANSPORTATION TECHNOLOGIST – BRIDGE DESIGN OPTION (20481-005)
QUALIFYING KNOWLEDGES, SKILLS, AND ABILITIES (KSAs)
2013

Knowledge of ALDOT forms such as payroll forms, expenses, and leave forms as found in the Alabama Department of Transportation (ALDOT) Policy and Procedures (P&P) manual to include proper use and completion as needed to document work hours, receive pay for appropriate time worked, and submit accurate paperwork to appropriate departments.

Knowledge of ALDOT Policies and Procedures to include information regarding reimbursement for travel, property control, purchasing guidelines and completing of accident forms as needed to comply with ALDOT rules and regulations, complete forms properly and purchase equipment.

Knowledge of ALDOT policies for design and detailing of all bridge components as found in ALDOT Structures Design and Detailing Manual as needed to review and evaluate plans and designs.

Knowledge of basic highway design principles to include horizontal and vertical curve, drainage and cross sections as needed to design, review, and build using highway construction plans.

Knowledge of bridge design software to include Micro Station, Bridge Geometry Program, Bridge Deck Cross Section Program, and Vertical Curve Program as needed to plot and detail a bridge deck, and lay out a bridge in a vertical curve.

Knowledge of common bridge design specifications as found in the Bridge Design Manual as needed to implement standard drawings into bridge design plans.

Knowledge of complex mathematics such as calculus and differential equations as needed to evaluate, implement, and understand research findings and technical journals.

Knowledge of Computer Aided Drafting & Design program (CADD) to include software and environments such as Micro station, Inroads, and Inxpress as needed to develop roadway plans, develop bridge design, develop fiber optics plans, and plan traffic signalization at intersections.

Knowledge of different types of concrete girders such as AASHTO Type 1, 2, 3, 4, and Bulb-T girders as needed to complete bridge designs.

Knowledge of common bridge terms and their meanings, such as transverses, vertical and horizontal clearances, spam links, abutments, bents, and ground lines.

Knowledge of Micro station software as needed to navigate through menus, detail individual bridge components, and produce plan sheets and plan sets.

Knowledge of common bridge plan sheets and what they contain such as plan views, section views, and detail drawings.

Knowledge of departmental and acceptable standards of bridge plans as needed to determine format and layout bridge detail sheets.

Ability to edit, revise, and adjust design plans as needed to make small changes to consultant plans, make changes based on environmental changes, and implement design plans.

Ability to operate plan reproduction equipment as needed to make copies of bridge and roadway plans.

Ability to perform algebraic equations to include solving basic trigonometric problems and analyzing design problems as needed to calculate horizontal and vertical curves.

Ability to read and interpret engineering drawings, design plans, and construction plans to include utility layouts, cross sections, and box sheets as needed to review employee work products, build or design according to specification, review information, and provide plan information to/from consultants.

Ability to read and interpret horizontal and vertical curve data as needed to determine the bridge layout, to evaluate the roadway layout, and to ensure that safety guidelines are met.
.
Ability to read hydrain/contour maps to include elevations and water accumulation and location as needed to determine water flow and direction in project designs.

Ability to research information such as roadway plans, technical information, bridge plans, and information about site terrain as needed to locate existing bridge stations, obtain length of span, determine weather history, and identify right-of-way marker changes.

Ability to use calculators as needed to calculate field quantities, calculate grades, determine the volume of concrete, and estimate the linear feet of drill shaft.

Ability to interact with others in a way that promotes good human relations as needed to supervise subordinates, and deal with citizens, government officials, and other ALDOT employees.

Ability to calculate quantities of bridge materials such as steel and concrete as needed to compare quantities shown on plans to quantities actually needed as required to verify quantities shown on plans.

Ability to calculate angles, lengths, and skews.

Ability to scale a set of roadway construction plans.

Ability to determine from a plan, set bridge elevations.

Ability to interpret bridge designer notes and sketches as needed to convert them to a buildable structure as represented in a complete bridge plan.

TRANSPORTATION TECHNOLOGIST - MATERIALS AND TESTS OPTION (20481-006)
QUALIFYING KNOWLEDGES, SKILLS, AND ABILITIES (KSAs)
2013

Knowledge of Alabama Department of Transportation (ALDOT) forms such as payroll forms, expenses, and leave forms as found in the ALDOT Policies and Procedures (P&P) manual to include proper use and completion as needed to document work hours, receive pay for appropriate time worked, and submit accurate paperwork to appropriate departments.

Knowledge of ALDOT personnel policies such as payroll information, holidays, sick leave, and expense accounts as found in the ALDOT Policies and Procedures Manual as needed to provide correct information to subordinates, charge government work, and complete ALDOT paperwork.

Knowledge of ethics guidelines to include the Engineering Code of Ethics and the Alabama Ethics Law as needed to ensure job operations of self and subordinates are within ethics guidelines.

Knowledge of materials specifications and testing procedures and guidelines as found in AASHTO, ASTM and ALDOT manuals as needed to evaluate current specifications and testing procedures and frequencies.

Knowledge of materials testing procedures and guidelines to include the frequency with which tests should be conducted, which materials should be tested, and identification of the proper test as found in the ALDOT Materials and Testing Manual as needed to instruct others on proper testing procedures and ensure that materials tests are conducted at appropriate intervals.

Knowledge of the approved pre-tested materials products and providers as found in the Materials, Resources, Devices with Special Acceptance Requirements as needed to incorporate use of approved products in project design and implementation.

Ability to write letters and memoranda using proper grammar, punctuation, and sentence structure as needed to provide or request information.

Ability to communicate orally in one-on-one situations to include providing and asking for information.

Ability to communicate orally in group situations to include providing and asking for information.

Ability to adjust communication to level of understanding of the recipient to include rephrasing information, and using analogies in order to relate subject information to the listener in a way that they understand and adapting style and content to a diverse audience.

Ability to communicate in writing in a concise and understandable manner using the appropriate writing style, content, and grammar as needed to compose interoffice and external correspondence.

Ability to communicate in writing in a concise and understandable manner using the appropriate writing style, content, and grammar as needed to compose technical reports and legal information.

Ability to communicate orally as needed to provide information and requests to others such as contractors, general public, and ALDOT employees.

Ability to communicate technical information in front of a small or large group of individuals at the appropriate level as needed to deliver instructions in training classes, lead meetings, and make presentations to contractors, subordinates, and the general public.

Ability to compose memoranda, letters, and other informal documents such as letters to other departments, letters to contractors, and memoranda to subordinates using proper grammar, punctuation, and sentence structure as needed to remind subordinates of policies, schedule meetings, convey information, and provide feedback or request additional data from consultants and FHWA.

Ability to respond to on-the-spot questions from others such as supervisors, contractors, subordinates, public officials, and citizens to include detailed design information as needed to provide consultants with justifications for modifications of design plans, inform citizens of project plan time lines, and conduct PS&E meetings.

Ability to write legibly as needed to provide instruction to others.

Ability to manage resources as needed to meet deadlines and maintain fiscal responsibility.

Ability to keep a continuous record of work such as a project diary as needed to maintain project information and to protect the department legally.

Ability to manage one's own time as needed to meet project guidelines and plan advance meetings.

Ability to manage resources to include personnel and equipment as needed to plan and complete projects.

Ability to organize and plan work activities as needed to manage project, determine appropriate projects stages and accomplish work goals.

Ability to plan work schedules for subordinate work groups to include assignment activity and work time and place as needed to ensure that project staffing demands are met.

Ability to set priorities for activities to include individual subordinates' activities and one's own work assignment as needed to deal with several situations or problems at the same time.

Ability to assign work to subordinates using appropriate considerations such as capitalizing on particular subordinate's strengths and deciding which responsibilities can be delegated as needed to increase work group performance.

Ability to conduct one-on-one training sessions with employees as needed to familiarize new employees with proper procedures, correct improper employee techniques, and inform employees of new procedures.

Ability to confront others when they have performance deficiencies or violate a policy, rule or procedure as needed to ensure subordinates recognize weaknesses and make necessary adjustments.

Ability to counsel employees with personal or work problems as needed to assist employees in maximizing job performance.

Ability to recommend disciplinary action for a subordinate that is consistent with the severity of a violation of ALDOT policy and procedure and various state and federal statutes as needed to maximize employee performance.

Ability to supervise subordinates to include assigning daily activities, making on the spot corrections, providing feedback on performance and work habits, and monitoring work products as needed to ensure that employees correctly perform work duties and schedule activities necessary.

Ability to apply specific non-engineering policies and procedures to include personnel policies, grievance procedures, and employee reimbursement procedures as needed to supervise employees and manage resources.

Ability to apply new knowledge from reading technical manuals, relevant periodicals, and textbooks as needed to stay abreast of professional standards and innovations.

Ability to perform algebra as needed to increase math proficiencies as they apply to materials testing and field engineering.

Ability to interpret directions received from others as needed to determine appropriate actions to take.

Ability to operate materials testing machinery to include drilling machine, compression tester, nuclear density gauges, asphalt content gauges, gyratory compactor, ignition oven, mechanical sifter/sieves, and a Marshall density hammer as needed to instruct others on their proper use, calibrate the equipment, recognize a problem with the machinery, and to test materials to determine whether they meet specifications.

Ability to operate the nuclear density gauge as needed to conduct compaction tests of soil and asphalt.

Ability to read manuals to include ALDOT specifications and manuals, AASHTO Manuals, etc. as needed to follow instructions from others, research information, and learn new techniques.

Ability to type as needed to complete reports and generate correspondence.

Ability to use calculators as needed to calculate field quantities, calculate grades, determine the volume of concrete, and estimate the linear feet of drill shaft.

Ability to use office equipment to include typewriters, computers, telephones, copiers, and fax machines as needed to perform administrative duties.

Ability to use the computer to include creating and accessing files as needed to generate reports, create correspondence and use software applications.

Ability to perform basic math functions such as decimals, fractions, and formulas as needed to convert measurements and determine test results.

Ability to assess a situation and make decisions with limited amount of information as needed to reallocate resources, determine appropriate contact when problems occur, and direct others in crises.

Ability to determine whether a decision should be made on one's own or referred to a supervisor or another source as needed to make decisions regarding where (to whom) a complaint should be referred.

Ability to attend to several situations and/or problems and/or responsibilities at the same time.

Ability to be "on-call" as needed to respond to crisis or problematic situations at any time of the day or night.

Ability to remain calm, impartial and flexible in conflicting and tense situations.

Ability to work outside in various types of weather such as rain, cold, and heat.

Ability to operate a motor vehicle.

Ability to locate material specifications on websites or written manuals.

Ability to read and understand equipment operating manuals as needed to calibrate, maintain, and operate various types of roadway testing material equipment.

Skill in driving at the level necessary to obtain an Alabama driver license as needed to drive trucks, vans, and cars to and from one project to another and to conduct friction testing, etc.

TRANSPORTATION TECHNOLOGIST-DESIGN OPTION (20481-007)
QUALIFYING KNOWLEDGES, SKILLS, AND ABILITIES (KSAs)
2013

Knowledge of project specifications and records maintenance guidelines as found in the Construction Manual and the Guidelines for Development of Construction Plans as needed to keep records, and construct bridges and roadways.

Knowledge of Alabama Department of Transportation (ALDOT) grievance procedures to include grievance steps, grievable issues, and appeal process as needed to address employee grievances.

Knowledge of ALDOT personnel policies such as payroll information, holidays, sick leave, and expense accounts as found in the ALDOT Policies and Procedures Manual as needed to provide correct information to subordinates, charge government work, and complete ALDOT paperwork.

Knowledge of ALDOT Guidelines for Operations Manual as needed to access information and ensure work is in compliance with state guidelines.

Knowledge of basic highway design principles to include horizontal and vertical curve, drainage, and cross sections as needed to design, review, and build using highway construction plans.

Knowledge of common roadway design specifications as found in the Standard & Special Drawing Book as needed to implement standard drawings into roadway design plans.

Knowledge of Computer Aided Drafting & Design program (CADD) to include software and environments such as Micro station 95, Inroads, and Inxpress as needed to develop roadway plans, develop bridge design, develop fiber optics plans, and plan traffic signalization at intersections.

Ability to write letters and memoranda using proper grammar, punctuation, and sentence structure as needed to provide or request information.

Ability to communicate orally in one-on-one situations to include providing and asking for information.

Ability to communicate orally in group situations to include providing and asking for information.

Ability to adjust communication to level of understanding of the recipient to include rephrasing information, and using analogies in order to relate subject information to the listener in a way that they understand and adapting style and content to a diverse audience.

Ability to communicate in writing in a concise and understandable manner using the appropriate writing style, content, and grammar as needed to compose interoffice and external correspondence.

Ability to communicate in writing in a concise and understandable manner using the appropriate writing style, content, and grammar as needed to compose technical reports and legal information.

Ability to communicate orally as needed to provide information and requests to others such as contractors, general public, and ALDOT employees.

Ability to compose memoranda, letters, and other informal documents such as letters to other departments, letters to contractors, and memoranda to subordinates using proper grammar, punctuation, and sentence structure as needed to remind subordinates of policies, schedule meetings, convey information, and provide feedback or request additional data from consultants and FHWA.

Ability to respond to on-the-spot questions from others such as supervisors, contractors, subordinates, public officials, and citizens to include detailed design information as needed to provide consultants with justifications for modifications of design plans, inform citizens of project plan time lines, and conduct PS&E meetings.

Ability to write legibly as needed to provide instruction to others.

Ability to apply management principles as needed to prioritize work activities and manage multiple tasks/projects.

Ability to manage one's own time as needed to meet project guidelines and plan advance meetings.

Ability to manage resources to include personnel and equipment as needed to plan and complete projects.

Ability to organize and plan work activities as needed to manage project, determine appropriate projects stages, and accomplish work goals.

Ability to set priorities for activities to include individual subordinates' activities and one's own work assignment as needed to deal with several situations or problems at the same time.

Ability to conduct one-on-one training sessions with employees as needed to familiarize new employees with proper procedures, correct improper employee techniques, and inform employees of new procedures.

Ability to take responsibility for job-related decisions such as design decisions and employee assignments.

Ability to apply new knowledge from reading technical manuals, relevant periodicals, and textbooks as needed to stay abreast of professional standards and innovations.

Ability to apply ALDOT specific engineering policies and procedures to include testing, inspection, and maintenance methods as needed to complete engineering related tasks.

Ability to perform advanced mathematics to include algebra, geometry, and trigonometry as needed to increase math proficiencies as they apply to technical engineering tasks such as surveying, designing, materials testing, and field engineering.

Ability to interpret directions received from others as needed to determine appropriate actions to take.

Ability to interpret survey information to include reviewing field notes and incorporating that information into a roadway design as needed to develop project plans.

Ability to perform algebraic equations to include solving basic trigonometric problems and analyzing design problems as needed to calculate horizontal and vertical curves.

Ability to read and interpret engineering drawings, design plans and construction plans to include utility layouts, cross sections, and box sheets as needed to review employee work products, build or design according to specification, review information, and provide plan information to/from consultants.

Ability to read manuals to include ALDOT specifications and manuals, AASHTO Manuals, etc. as needed to follow instructions from others, research information, and learn new techniques.

Ability to read maps such as county, state, and city maps as needed to get to project location and to determine project limits.

Ability to read right-of-way maps to include limits as needed to follow deed descriptions, to stay within proper surveying boundaries, and to provide information to the general public.

Ability to research information such as roadway plans, technical information, bridge plans, and information about site terrain as needed to locate existing bridge stations, obtain length of span, determine weather history, and identify right-of-way marker changes.

Ability to type as needed to complete reports and generate correspondence.

Ability to use calculators as needed to calculate field quantities, calculate grades, determine the volume of concrete, and estimate the linear feet of drill shaft
.
Ability to use office equipment to include typewriters, computers, telephones, copiers, and fax machines as needed to perform administrative duties.

Ability to use the computer to include creating and accessing files as needed to generate reports, create correspondence, and use software applications.

Ability to determine whether a decision should be made on one's own or referred to a supervisor or another source as needed to make project design decisions and design modifications.

Ability to attend to several situations and/or problems and/or responsibilities at the same time.

Ability to interact with others in a way that promotes good human relations as needed to supervise subordinates, and deal with citizens, government officials, and other ALDOT employees.

Ability to remain calm, impartial, and flexible in conflicting and tense situations.

Ability to create Excel spreadsheets as needed to calculate costs and/or quantities.

Ability to locate project sites and features using Google Earth and Navigation Pro.

Skill in driving at the level necessary to obtain an Alabama driver license as needed to drive trucks, vans and cars to from one project to another and to conduct friction testing, etc.

TRANSPORTATION TECHNOLOGIST-CONSTRUCTION OPTION (20481-438)
QUALIFYING KNOWLEDGES, SKILLS, AND ABILITIES (KSAs)
2013

Knowledge of ALDOT forms such as payroll forms, expenses, and leave forms as found in the Alabama Department of Transportation (ALDOT) Policies and Procedures (P&P) manual to include proper use and completion as needed to document work hours, receive pay for appropriate time worked, and submit accurate paperwork to appropriate departments.

Knowledge of ALDOT Policies and Procedures to include information regarding reimbursement for travel, property control, purchasing guidelines and completing of accident forms as needed to comply with ALDOT rules and regulations, complete forms properly and purchase equipment.

Knowledge of ALDOT forms such as E8 - requisition forms, PMS-1 funding forms, and equipment usage reports as found in the Construction Manual and ALDOT P&P manual to include proper use and completion as needed to obtain funds for projects, keep information about equipment usage, and request supplies.

Knowledge of ALDOT personnel policies such as payroll information, holidays, sick leave, and expense accounts as found in the ALDOT Policies and Procedures Manual as needed to provide correct information to subordinates, charge government work, and complete ALDOT paperwork
.
Knowledge of ALDOT organizational structure to include division locations, key persons in divisions and bureaus, and the functions of bureaus as needed to correspond with ALDOT employees, make requests, and direct others (general public, contractors) to appropriate source.

Knowledge of basic computer software as needed to compose letters, calculate quantities, and keep a card file.

Knowledge of Standard & Specifications books (Metric & English) to include how to research information regarding standard specs for bridge/roadway designs.

Skill in driving at the level necessary to obtain an Alabama driver license as needed to drive trucks, vans, and cars to and from one project to another, and to conduct friction testing, etc.

Ability to write technical documents as needed to document engineering related activities.

Ability to write letters and memoranda using proper grammar, punctuation, and sentence structure as needed to provide or request information.

Ability to communicate orally in one-on-one situations to include providing and asking for information.

Ability to communicate orally in group situations to include providing and asking for information.

Ability to adjust communication to level of understanding of the recipient to include rephrasing information, and using analogies in order to relate subject information to the listener in a way that they understand and adapting style and content to a diverse audience.

Ability to communicate in writing in a concise and understandable manner using the appropriate writing

style, content, and grammar as needed to compose interoffice and external correspondence.

Ability to communicate in writing in a concise and understandable manner using the appropriate writing style, content, and grammar as needed to compose technical reports and legal information.

Ability to communicate orally as needed to provide information and requests to others such as contractors, general public, and ALDOT employees.

Ability to compose memoranda, letters and other informal documents such as letters to other departments, letters to contractors, and memoranda to subordinates using proper grammar, punctuation, and sentence structure as needed to remind subordinates of policies, schedule meetings, convey information, and provide feedback or request additional data from consultants and FHWA.

Ability to respond to on-the-spot questions from others such as supervisors, contractors, subordinates, public officials and citizens to include detailed design information as needed to provide consultants with justifications for modifications of design plans, inform citizens of project plan time lines, and conduct PS&E meetings.

Ability to write legibly as needed to provide instruction to others.

Ability to apply management principles as needed to prioritize work activities and manage multiple tasks/projects.

Ability to manage resources as needed to meet deadlines and maintain fiscal responsibility.

Ability to manage one's own time as needed to meet project guidelines and plan advance meetings.

Ability to manage resources to include personnel and equipment as needed to plan and complete projects.

Ability to organize and plan work activities as needed to manage project, determine appropriate projects stages, and accomplish work goals.

Ability to plan work schedules for subordinate work groups to include assignment activity and work time and place as needed to ensure that project staffing demands are met.

Ability to set priorities for activities to include individual subordinates' activities and one's own work assignment as needed to deal with several situations or problems at the same time.

Ability to conduct one-on-one training sessions with employees as needed to familiarize new employees with proper procedures, correct improper employee techniques, and inform employees of new procedures.

Ability to confront others when they have performance deficiencies or violate a policy, rule, or procedure as needed to ensure subordinates recognize weaknesses and make necessary adjustments.

Ability to supervise subordinates to include assigning daily activities, making on the spot corrections, providing feedback on performance and work habits, and monitoring work products as needed to ensure that employees correctly perform work duties and schedule activities necessary.

Ability to use motivational tools such as positive feedback and encouragement with subordinates as needed to increase subordinate work performance.

Ability to apply ALDOT specific engineering policies and procedures to include testing, inspection, and maintenance methods as needed to complete engineering related tasks.

Ability to perform trigonometry as needed to increase math proficiencies as they apply to surveying.

Ability to perform geometry as needed to increase math proficiencies as they apply to designing and field engineering.

Ability to perform advanced mathematics to include algebra, geometry, and trigonometry as needed to increase math proficiencies as they apply to technical engineering tasks such as surveying, designing, materials testing, and field engineering.

Ability to convert standard measurements (distances and weights) to metrics such as mileage markers, old reports, and old plans as needed to incorporate old plan designs into new plans and to calculate quantities.

Ability to operate computers as needed to operate Skid truck programs, store traffic data, keep diaries, design signs, maintain inventories, complete ALDOT forms, and design plans.

Ability to operate surveying equipment such as level, transit, and survey data collectors as needed to gather survey data on project sites, calculate quantities, complete forms, communicate with personnel, and/or train other employees on correct operations.

Ability to operate the nuclear density gauge as needed to conduct compaction tests of soil and asphalt.

Ability to perform algebraic equations to include solving basic trigonometric problems and analyzing design problems as needed to calculate horizontal and vertical curves.

Ability to read and interpret engineering drawings, design plans, and construction plans to include utility layouts, cross sections, and box sheets as needed to review employee work products, build or design according to specification, and review information and provide plan information to/from consultants.

Ability to read manuals to include ALDOT specifications and manuals, AASHTO Manuals, etc. as needed to follow instructions from others, research information, and learn new techniques.

Ability to read maps such as county, state, and city maps as needed to get to project location and to determine project limits.

Ability to type as needed to complete reports and generate correspondence on the typewriter or computer.

Ability to use calculators as needed to calculate field quantities, calculate grades, determine the volume of concrete, and estimate the linear feet of drill shaft.

Ability to use office equipment to include typewriters, computers, telephones, copiers, and fax machines as needed to perform administrative duties.

Ability to use the computer to include creating and accessing files as needed to generate reports, create correspondence, and use software applications.

Ability to assess a situation and make decisions with limited amount of information as needed to reallocate resources, determine appropriate contact when problems occur, and direct others in crises.

Ability to determine whether a decision should be made on one's own or referred to a supervisor or another source as needed to make project design decisions and design modifications.

Ability to determine whether a decision should be made on one's own or referred to a supervisor or another source as needed to make decisions regarding where (to whom) a complaint should be referred.

Ability to identify and anticipate the likely consequences of implementing various courses of action in a particular situation.

Ability to attend to several situations and/or problems and/or responsibilities at the same time.

Ability to be creative in the development of new or modification of existing plans, procedures, strategies, and tactics as needed to accomplish work activities in unusual or changing situations.

Ability to calm hostile individuals such as citizens with complaints, irate individuals, and politicians as needed to maintain an environment conducive for good job performance and maintain department public relations.

Ability to remain calm, impartial, and flexible in conflicting and tense situations.

Ability to read and understand plans and contracts as needed to ensure projects are being constructed properly.

Ability to perform appropriate field tests on construction materials such as concrete, asphalt, and soil.

TRANSPORTATION TECHNOLOGIST-ANALYSIS and PLANNING OPTION (20481-439)
QUALIFYING KNOWLEDGES, SKILLS, AND ABILITIES (KSAs)
2013

Knowledge of ALDOT personnel policies such as payroll information, holidays, sick leave, and expense accounts as found in the ALDOT Policies and Procedures Manual as needed to provide correct information to subordinates, charge government work, and complete ALDOT paperwork.

Knowledge of basic computer software as needed to compose letters, calculate quantities, and keep a card file.

Ability to write technical documents as needed to document engineering related activities.

Ability to write letters and memoranda using proper grammar, punctuation, and sentence structure as needed to provide or request information.

Ability to communicate orally in one-on-one situations to include providing and asking for information.

Ability to communicate orally in group situations to include providing and asking for information.

Ability to communicate in writing in a concise and understandable manner using the appropriate writing style, content, and grammar as needed to compose interoffice and external correspondence.

Ability to communicate in writing in a concise and understandable manner using the appropriate writing style, content, and grammar as needed to compose technical reports and legal information.

Ability to communicate technical information in front of a small or large group of individuals at the appropriate level as needed to deliver instructions in training classes, lead meetings, and make presentations to contractors, subordinates, and the general public.

Ability to compose memoranda, letters and other informal documents such as letters to other departments, letters to contractors and memoranda to subordinates using proper grammar, punctuation, and sentence structure as needed to remind subordinates of policies, schedule meetings, convey information, and provide feedback or request additional data from consultants and FHWA.

Ability to write legibly as needed to provide instruction to others.

Ability to apply management principles as needed to prioritize work activities and manage multiple tasks/projects.

Ability to manage resources as needed to meet deadlines and maintain fiscal responsibility.

Ability to keep a continuous record of work such as a project diary as needed to maintain project information and to protect the department legally.

Ability to manage one’s own time as needed to meet project guidelines and plan advance meetings.

Ability to manage resources to include personnel and equipment as needed to plan and complete projects.

Ability to organize and plan work activities as needed to manage project, determine appropriate projects stages, and accomplish work goals.

Ability to set priorities for activities to include individual subordinates' activities and one's own work assignment as needed to deal with several situations or problems at the same time.

Ability to apply new knowledge from reading technical manuals, relevant periodicals, and textbooks as needed to stay abreast of professional standards and innovations.

Ability to interpret directions received from others as needed to determine appropriate actions to take.

Ability to read manuals to include ALDOT specifications and manuals, AASHTO Manuals, etc. as needed to follow instructions from others, research information, and learn new techniques.

Ability to read maps such as county, state, and city maps as needed to get to project location and to determine project limits.

Ability to type as needed to complete reports and generate correspondence.

Ability to use office equipment to include typewriters, computers, telephones, copiers, and fax machines as needed to perform administrative duties.

Ability to use the computer to include creating and accessing files as needed to generate reports, create correspondence, and use software applications.

Ability to determine whether a decision should be made on one's own or referred to a supervisor or another source as needed to make project design decisions and design modifications.

Ability to identify and anticipate the likely consequences of implementing various courses of action in a particular situation.

Ability to attend to several situations and/or problems and/or responsibilities at the same time.

Ability to interact with others in a way that promotes good human relations as needed to supervise subordinates, and deal with citizens, government officials, and other ALDOT employees.

Ability to remain calm, impartial, and flexible in conflicting and tense situations.

Skill in driving at the level necessary to obtain an Alabama driver license as needed to drive trucks, vans, and cars to and from one project to another, and to conduct friction testing, etc.

TRANSPORTATION TECHNOLOGIST-UNDERWATER BRIDGE INSPECTION OPTION (20481-498)
QUALIFYING KNOWLEDGES, SKILLS, AND ABILITIES (KSAs)
2013

Knowledge of the required maintenance and cleaning requirements of commercial diving equipment such as wet and dry suits, air compressors, diving helmets, boats, and vehicles.

Knowledge of the US Navy Diving Manual to include charts & Tables, diving physics and physiology, and equipment set up procedures as needed to prepare for diving assignments, perform diver tending duties and perform bridge inspection or maintenance dives.

Knowledge of Red Cross basic first aid to include stabilizing limbs, moving injured persons, flushing out eyes, treating symptoms of heat exhaustion and hypothermia, and treatment of cuts as needed to assist the diver and others in emergency situations.

Knowledge of the ADCI Consensus Standards to include safe diving operations, emergency diving practices, and minimum equipment requirements as needed to prepare for diving assignments, perform diver tending duties, and perform bridge inspection or maintenance dives.

Knowledge of safe boating operations to include how to launch and operate a boat within a dive area and on inland and coastal waters.

Ability to communicate orally one-on-one with individuals, maintain relationships with individuals, and maintain/promote a good image of the ALDOT as needed to receive and provide information about dive team assignments and to communicate diving operation information to citizens who are in the diving area.

Ability to communicate in writing as needed to correspond with other divers, supervisors, and other division personnel concerning inspection results and repairs needed or performed.

Ability to communicate in writing by composing dive reports, checklists, and dive logs as needed to document boating and diving operations.

Ability to draw/sketch diagrams as needed to prepare a visual representation of the diving inspection report and logs.

Ability to read and comprehend equipment manuals such as Air Compressor Manuals, Vehicle Manual, Diving Helmet Manuals, Diver console manuals, and video manuals as needed to set up, operate, maintain, and repair equipment.

Ability to read and comprehend operations manuals such as the U.S. Navy Diving Manual, ADCI Consensus Standards, and the ALDOT Bridge Inspection Manual as needed to set up, operate, maintain, and repair equipment.

Ability to read measuring devices such as digital and analog gauges, micrometers, rulers, tape measure, and homemade measuring devices as needed to obtain water levels for depth calculations, to determine the amount of substructure deficiencies, and set benchmark or calibration points in order to establish a reference standard.

Ability to interpret U.S. Navy diving charts to include decompression, no decompression, and residual nitrogen tables as needed to develop dive plans and compute safe diving times and depths.

Ability to perform mathematical calculations to include addition, subtraction, multiplication, division, and algebraic equations as needed to compute time depth ratios, air volumes, volumes of cylinders, and absolute, gauge and partial pressures.

Ability to perform First aid/AED/CPR to include artificial respiration, chest compression, and stabilizing the victim as needed to assist the diver and others in emergency situations.

Ability to operate an Ultrasonic Thickness Gauge to include setup, calibrating, conducting tests, and evaluating readings as needed to obtain the measurements of a bridge's structural elements and the deterioration of underwater metal components.

Ability to operate vehicles to include backing up and parking with a trailer attached as needed to travel to and from dive sites.

Ability to operate a boat measuring up to 26 ft. as needed to travel to and from dive sites and conduct hydrographic surveys and dives.

Ability to operate an underwater torch as needed to cut angle supports, and remove debris.

Ability to operate underwater video equipment as needed to document bridge inspections and repairs.

Ability to operate underwater equipment and tools such as jack hammers, hydro blasters, and chainsaws as needed to clear debris and perform inspection and repairs on bridges.

Ability to operate underwater welding equipment as needed to attach bracing or perform other underwater repairs.

Ability to perform construction work such as assembling forms and pumping concrete as needed to encase and re-encase steel pilings.

Ability to make mechanical repairs to equipment such as rebuilding regulators, changing fuel filters, changing spark plugs, replacing hose fittings, and repairing diving helmet audio as needed to maintain operational readiness.

Ability to work underwater in confined spaces as small as a 36" diameter pipe culvert, in coffer dams, underneath footings, and the toe wall of culverts as needed to conduct underwater bridge inspection and maintenance activities.

Ability to work underwater in difficult environmental situations such as heavy pollution, deep mud, or potentially dangerous animals.

Ability to work in limited or zero visibility underwater as needed to perform bridge inspection or maintenance dives.

Ability to feel underwater elements as needed to maintain direction and to form a mental picture of the material being inspected, to include identified deficiencies.

Ability to correctly estimate distances and shapes in zero visibility water in order to measure substructure sizes and deficiencies.

Ability to swim distances of up to 100 feet in full commercial dive gear as needed to move from one bridge element to another while conducting inspection and/or maintenance activities.

Ability to dive or monitor top side activities in all types of weather and water temperatures.

Ability to drag/lift divers and equipment weighing up to 250 pounds from the water in emergency situations to include cylinders, diver umbilical, video umbilical, consoles, and generators as needed to load and unload equipment.

Ability to hear as needed to identify origin of sounds, communicate with diver using audio equipment, respond to emergency alarms, and identify dangers to diver.

Ability to see as needed to conduct dive operations, observe movements of the diver, communicate with crane operators using hand signals, and observe objects or animals in the water.

Ability to climb while carrying equipment weighing up to 150 pounds as needed to get in and out of a boat, traverse slopes of rip-rap, and maneuver on scaffolding.

Ability to keep one's balance to include standing on a moving boat and walking on scaffolding or rocks in order to perform diving assignments, tending duties, and bridge inspection and/or maintenance activities.

Ability to work with others to include cooperation, tolerance, and patience as needed to perform assigned underwater and topside duties and to ensure a safe working environment.

Ability to attend and pass all federally mandated bridge inspections courses.

Ability to obtain and maintain an Alabama Driver's License.

Ability to obtain and maintain an Alabama Boat Operator's License/endorsement.